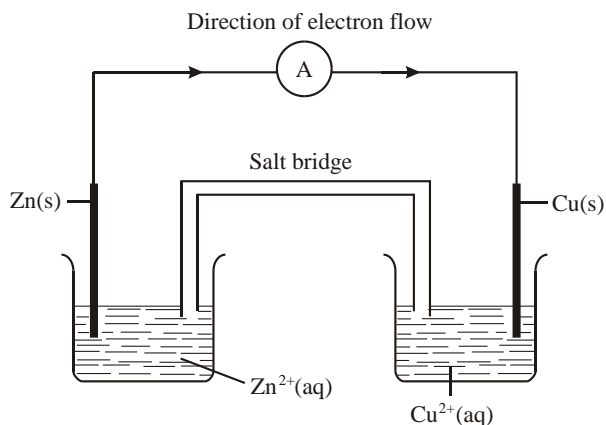


## T09D04 – 19.1-2 IB Practice

Name.....

1.



(a) The apparatus shown above may be used to carry out a redox reaction.

(i) State the function of the salt bridge.

(1)

(ii) Write a half-equation for the oxidation reaction.

(1)

(iii) The above reactions are carried out under *standard conditions*.

State what the standard conditions are for the cell.

(2)

(iv) Using the Data Booklet, calculate the cell potential for the above cell.

(2)

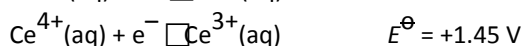
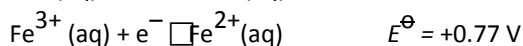
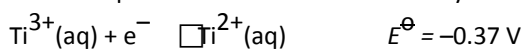
(v) State and explain what happens to the concentration of the copper(II) ions when the cell is producing an electric current.

(2)

(vi) State **two** observations that could be made if the zinc rod were placed in a solution of copper(II) ions.

(2)

(b) The standard electrode potentials for three electrode systems are given below.



(i) Using the data above, deduce which species is the best reducing agent, giving a reason in terms of electrons for your answer.

(2)

(ii) Write an equation, including state symbols, for the overall reaction with the greatest cell potential.

(2)

(iii) State and explain the sign of  $\Delta G^{\ominus}$  for the reaction in (b) (ii).

(2)

- (c) (i) State the name of a solution that would produce **only** hydrogen and oxygen when electrolyzed using platinum electrodes.

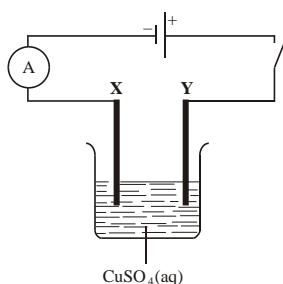
(1)

- (ii) Draw a diagram of apparatus that would allow the gases produced in the reaction in (c) (i) to be collected separately. Annotate your diagram to show the polarity of each electrode and the names and relative volumes of each gas.

(3)

(Total 20 marks)

2.



Two copper strips **X** and **Y** are placed in an aqueous solution of copper(II) sulfate and electrolyzed for a certain time. **X** was then dried and weighed.

- (i) State and explain what would happen to the mass of **X**.

(3)

- (ii) State **two** ways in which the change in the mass of **X** could be increased.

(2)

(Total 5 marks)

3. (a) In one experiment involving the electrolysis of molten sodium chloride, 0.1 mol of chlorine was formed. Deduce, giving a reason, the amount of sodium formed at the same time.

(2)

- (b) In another experiment involving the electrolysis of molten sodium chloride, the time of the electrolysis was halved and the current increased from 1 amp to 5 amp, compared to the experiment in (a). Deduce the amount of chlorine formed, showing your working.

(2)

- (c) If dilute aqueous sodium chloride is electrolyzed, a different product is obtained at each electrode. Identify the product formed at each electrode and write an equation showing its formation.

(4)

(Total 8 marks)